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(56) Documents cited  
GB 0380915 A WO 80/01757 A1 US 4765621 A  
US 4441712 A US 4203597 A US 4057249 A

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(54) Games racket

(57) A games racket comprises at least one stringing auxiliary device 50 having a support member 51, a plurality of axle pins 58 and a plurality of rolling members 62. The support member is fastened at both ends thereof to the head frame and is provided with a plurality of equidistantly spaced string holes 55 located on one side along the longitudinal axis thereof.

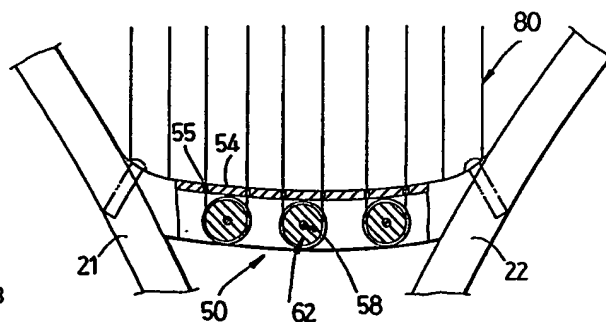


FIG. 2

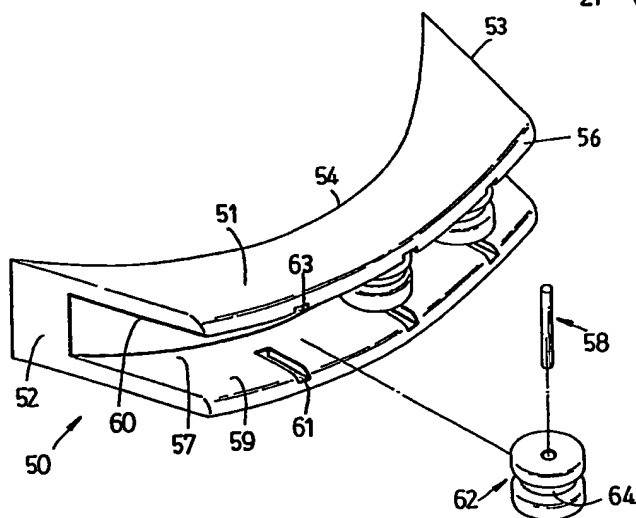


FIG. 3

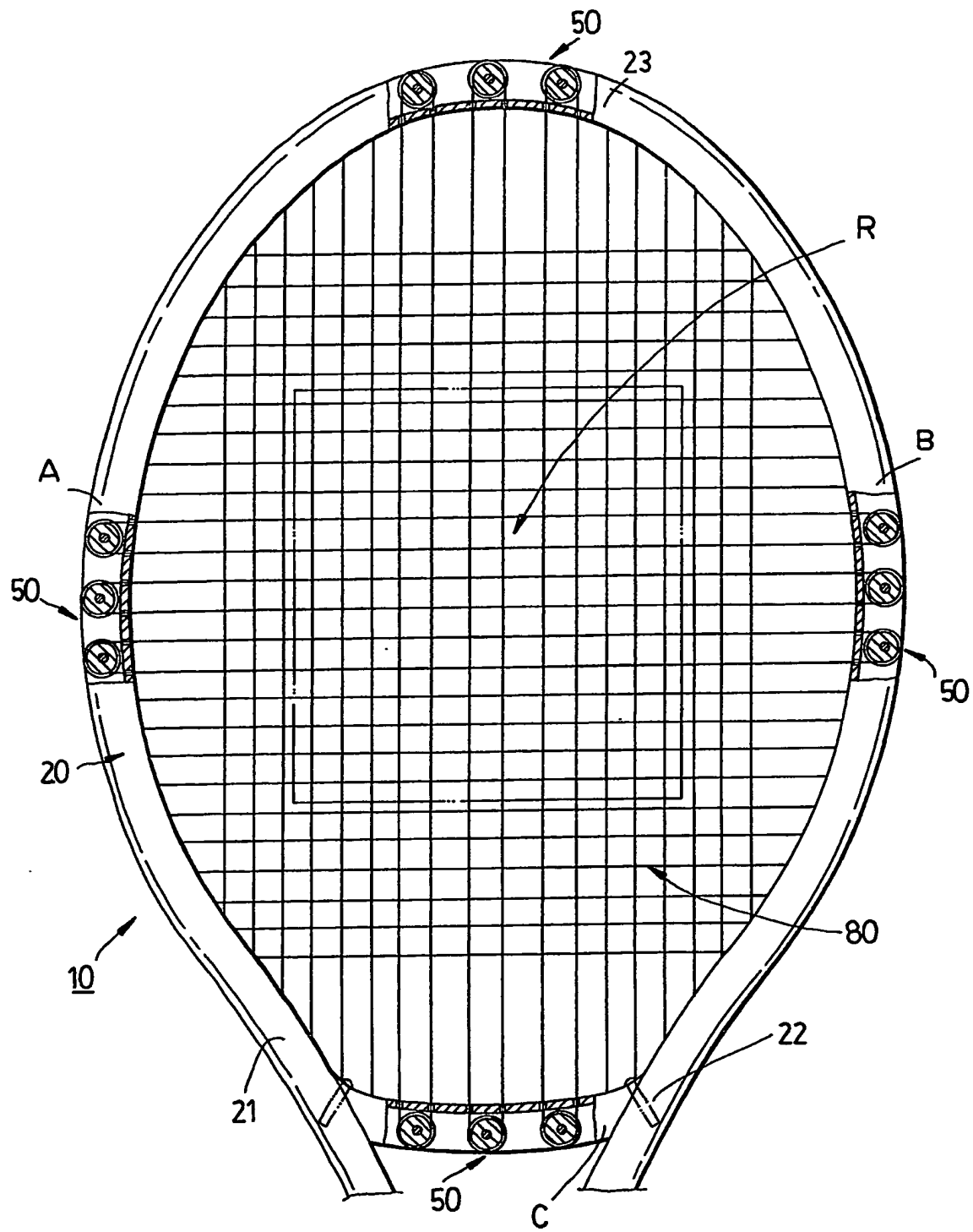


FIG. 1

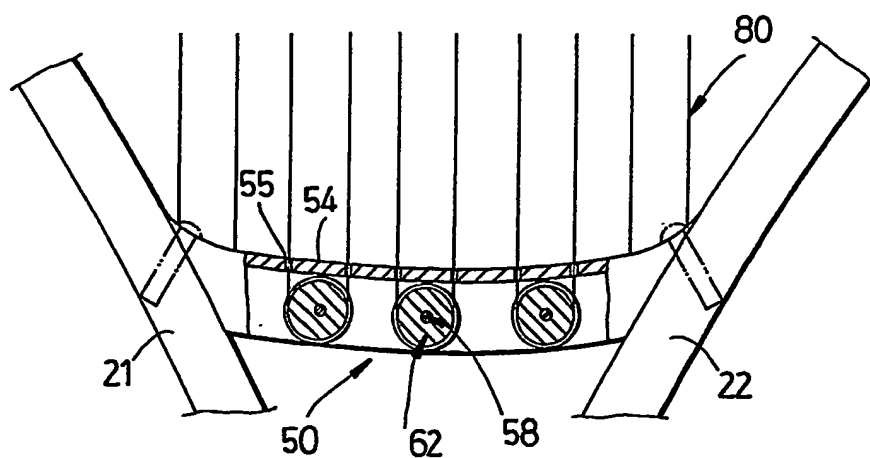


FIG. 2

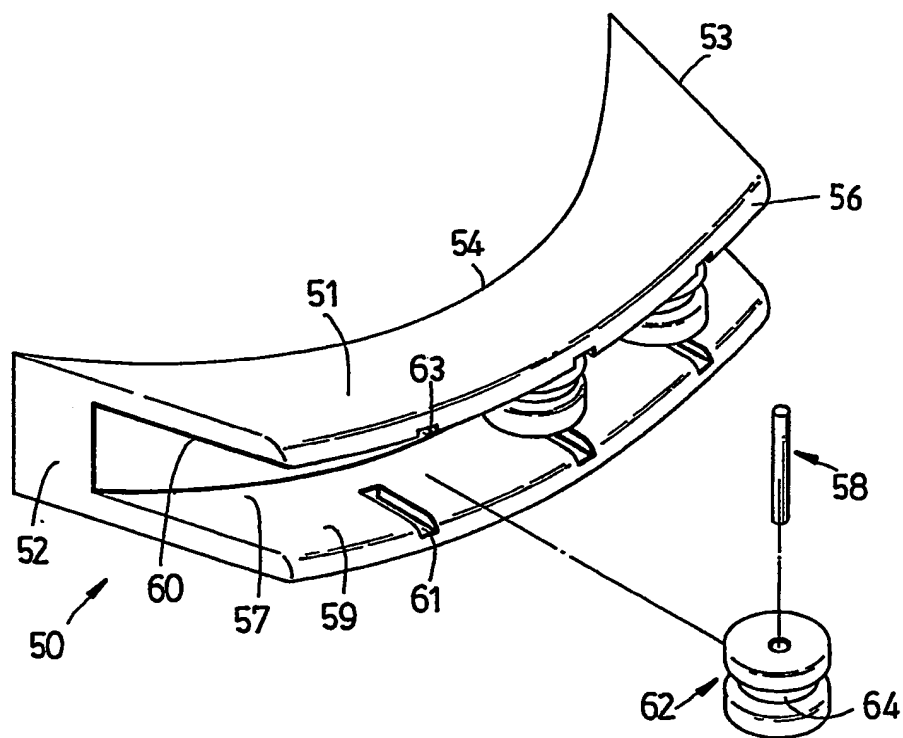


FIG. 3

## GAME RACKET

### BACKGROUND OF THE INVENTION

The present invention relates to a game racket, and more particular to a tennis racket and the like.

Most of the prior art tennis rackets are provided with an oval head frame having stretched strings that are put through from one string hole to another. Such stringing method is defective in that the string passing through the two neighboring string holes tends to form an acute angle at the bending portion of the string located between the two string holes adjacent to each other. As a result, the force of impact is for the most part exerted on those strings which are stricken by a ball, thereby resulting in a severe shock of the racket. A player holding such racket is generally confronted with difficulty to control the ball in question as desired. In order to find a solution to such problem as described above, a United States Patent bearing the number of 4,591,165 discloses a racket head frame having a slidable block located between the two adjacent string holes and provided with a bottom of arcuate profile in contact with the surface of the head frame in a tangent manner so as to transmit the tension between the two neighboring stricken strings to other strings which are not impacted directly by the ball. From a theoretical point of view, such embodiment is workable; nevertheless it is painfully time-consuming to dispose the slidable block between the two

strings passing through the two adjacent string holes at the same time when the process of stringing is under way. In addition, such method of transmitting the tension of strings generated by the impact of a ball is of a sliding friction type and is therefore not as effective as one would expect.

## **SUMMARY OF THE INVENTION**

It is, therefore, the primary objective of the present invention to provide a sports racket with an improved structure capable of transmitting the tension exerting on the two adjoining impacted strings by means of rolling friction type so as to distribute uniformly the tension energy to a plurality of the strings making up the racket head.

It is another objective of the present invention to provide a sports racket with an improved structure of head frame, which does not complicate the stringing process of the racket head.

In keeping with the principles of the present invention, the foregoing objectives of the present invention are accomplished by a game racket having a head frame of oval construction, a shaft attached to the free end of the head frame, and a hand grip coupled with the shaft. Such game racket is characterized in that it is provided with at least an auxiliary device for stringing its head frame, and that such stringing auxiliary device is arranged in a location corresponding to that of the sweet spot, and further that the auxiliary device comprises a support member of a predetermined length, a plurality of axle pins, and a plurality of rolling members. The support member is fastened at both ends thereof to the head frame and is provided with a plurality of equidistantly spaced string holes

located on one side along the longitudinal axis thereof. The support member is further provided with a long slot located on the side opposite to the side where the string holes are located. The axle pins are pivotally coupled with the walls making up the long slot while the rolling members are mounted rotatably on the axle pins. Each of those strings which make up the sweet spot is inserted through a string hole of the support member and is then made to encircle the circumference of a rolling member before entering another string hole adjacent to the string hole into which it was initially put. Such auxiliary device of the present invention serves effectively the purpose of transmitting the tension, which is generated by the strings impacted by an incoming ball, to a plurality of strings so as to mitigate the shock and to enhance the ball-controlling capability of the game racket.

The foregoing objectives and features of the present invention will be better understood by studying the following detailed description of a preferred embodiment of the present invention, in conjunction with the drawings provided herewith.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 shows a plan view of a game racket embodied in the present invention.

FIG. 2 shows an enlarged plan view of portion of the game racket as shown in FIG. 1.

FIG. 3 shows a three-dimensional view of a stringing auxiliary device of the present invention.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to FIGS. 1, 2 and 3, a game racket 10 of the present invention is shown comprising an oval head frame 20, a shaft coupled with the two head branches 21 and 22 making up the free end of the head frame 20, and a hand grip (not shown in the drawings provided herein) attached to the shaft.

The game racket 10 is characterized in that it comprises <sup>at least one and preferably</sup> four stringing auxiliary devices 50, each of which has a support member 51 of a predetermined length, three axle pins 58, and three pulleys 62, as shown in FIG. 3. The support member 51 has two side slants 52 and 53, which are perpendicular to the longitudinal axis of the support member 51. A side surface 54 along the longitudinal axis of the support member 51 is provided with the six string holes 55 which are equidistantly spaced, while another side surface 56 opposite to the side surface 54 is furnished with a long slot 57. There are three pulleys 62, each of which is rotatably mounted on an axle pin 58 whose both ends are lodged in the grooves 61 and 63 of the slot walls 59 and 60 of the long slot 57. Each pulley 62 has a string groove 64 located on the circumference thereof for receiving the string.

In the process of making the game racket 10 of the present invention, the four stringing auxiliary devices 50 are respectively mounted in the four areas of the head frame 20, which are designated as 23, B, C and A and are respectively corresponding to twelve, three, six and nine of the clock. The remainder of the

head frame 20 is provided with a plurality of string holes similar to those of the prior art racket.

In the process of providing the auxiliary device 50 with the strings 80, the string 80 is first inserted in the string hole 55 of the support member 51 and is then received in the string groove 64 to run through the pulley 62 before being inserted in another string hole 55 adjacent to the string hole 55 into which the string 80 was initially put.

Those cross and longitudinal strings 80, which make up the center designated as R of the sweet spot, are mounted in the stringing auxiliary devices 50. As a result, when the tension is generated by the strings 80 impacted directly by a ball, such tension is effectively and rapidly transmitted to other neighboring strings 80 in a manner similar to a phenomenon known as ripple effect, so as to enhance the ball-controlling and the shock-absorbing capabilities of the game racket 10 of the present invention.



**WHAT IS CLAIMED IS:**

1. A game racket comprising a head frame having a stringed surface with a sweet spot and having two head branches forming an open end, a shaft coupled at one end thereof with said head branches of said head frame, and a hand grip fastened to another end of said shaft; wherein said game racket is characterized in that its head frame comprises at least one stringing auxiliary device mounted in a location corresponding to said sweet spot of said head frame, said stringing auxiliary device comprising:

- (a) a support member of a length having two side slants which are perpendicular to a longitudinal axis of said support member and which are fastened respectively to a location in said head frame corresponding to said sweet spot, said support member further having an inner side surface which is parallel to said longitudinal axis of said support member and provided with a plurality of string holes, said support member still further having an outer side surface which is parallel to said longitudinal axis of said support member and provided with a long slot;
- (b) a plurality of axle pins mounted pivotally in said long slot in such manners that they are spaced equidistantly and that they are perpendicular to said stringed surface of said head frame; and
- (c) a plurality of rolling members corresponding in number to said axle pins and mounted rotatably on said axle pins, with each of said rolling members provided with a string groove to receive therein a string.

2. The game racket of claim 1 wherein said head frame is a closed frame by virtue of the fact that it comprises said stringing auxiliary device disposed in such a manner that its side slants are fastened securely to said two head branches forming said open end of said head frame.

3. The game racket of claim 1 wherein said rolling members are pulleys, each of which is provided with a string groove to receive therein a string.

5 4. A game racket comprising a head frame having a stringed surface, a shaft connected to the head frame and a hand grip at the free end of the shaft, wherein the head frame includes at least one auxiliary string support mounted in the head frame and having a plurality  
10 of freely rotatable members mounted for rotation about axes perpendicular or substantially perpendicular to the plane of the stringed surface, the rotatable members supporting some of the strings of the racket.

15 5. A game racket substantially as hereinbefore described with reference to the accompanying drawings.

Examiner's report to the Comptroller under  
Section 17 (The Search Report)

Application number

9211382.8

Relevant Technical fields

(i) UK CI (Edition K ) A6D D25A D25C

(ii) Int CL (Edition 5 ) A63B 49/00

Search Examiner

D WHITFIELD

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

25 JUNE 1992

Documents considered relevant following a search in respect of claims

1-5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 0380915 (WETHERED) - (whole document)	1-4
X	WO 80/01757 A1 (TCHICALOFF) - (whole document)	1-4
X	US 4765621 (GAME) - (whole document)	1-4
X	US 4441712 (GUTHKE) - (whole document)	1-4
X	US 4203597 (REEDHEAD) - (whole document)	1,3,4
X	US 4057249 (REEDHEAD) - (whole document)	1-4

Category	Identity of document and relevant passages	Relevant to claim(s)

#### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

**Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.

**A:** Document indicating technological background and/or state of the art.

**P:** Document published on or after the declared priority date but before the filing date of the present application.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

**&c:** Member of the same patent family, corresponding document.

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).